Marine Physical Laboratory

Swallow Float Data Collected During NATIVE I

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Research Summary

The objective of this program was to analyze the Swallow float data collected during NATIVE-I including Swallow float localization, transmission loss, and ambient noise directionality.

The MPL freely drifting Swallow float array participated in the NATIVE-I experiment in August 1990 approximately 600 km east of Savannah, Georgia. Twelve (12) Swallow floats were deployed during Event #1 (only 11 were recovered), 2 during Event #3, and 9 during Event #4.

In [1], representative data collected during Event #1 is analyzed. A number of interesting features of this data are discussed. First, the Swallow floats were clearly able to hear the 7, 10, and 16 Hz tones generated by the towed ELF source with signal-to-noise ratios of 15 dB or greater being common. Second, the two SUS charge events are identified. Third, the T-phase generated by an earthquake in the Leeward Islands of the Caribbean was recorded by all the floats. Lastly, a broad spectral peak at 0.47 Hz was identified and appears to be due to a water-column resonance (i.e. the fundamental "organ pipe" mode).

Additional analysis of the Event #1 data focussed primarily on transmission loss of the 7, 10, and 16 Hz tones projected by the ELF. In order to perform this analysis, the Swallow floats needed first to be localized. These time-evolving sensor positions then could be used for an accurate evaluation of transmission loss as a function of range. The Swallow float navigation and transmission loss measurement results were presented at the July 1991 NATIVE-I data analysis meeting [2]. These results along with ambient noise spectra calculated from the Swallow float data also proved useful for the purpose of comparing calibrations between sensor systems deployed during NATIVE-I.

As noted above, 2 Swallow floats were deployed during Event #3 and 9 Swallow floats were deployed during Event #4. Analyses similar to [1] were performed on this (classified) data. These results are contained in [3].

References

1. G.L. D'Spain, W.S. Hodgkiss, G.L. Edmonds, and M. Darling, "Freely Drifting Swallow Float Array: August 1990 NATIVE-I Experiment (First Deployment)," MPL-TM-426 (MPL-U-4/91) Marine Physical Laboratory, Scripps Institution of Oceanography, San Diego, CA (1991).
2. G.L. D'Spain, "Analysis of Swallow Float Data Recorded During NATIVE-I," NATIVE-I Data Analysis Meeting, NOARL, 30-31 July 1991.

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